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PROSPECTIVE DEVELOPMENT OF GIANT AIRPLANES

By B. Von Römer

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PROSPECTIVE DEVELOPMENT OF GIANT AIRPLANES.*

By B. Von Römer.

Germany undoubtedly leads the world in the construction of commercial airplanes. Although some countries, like Holland, England and France, have giant commercial airplanes with good flight characteristics, it must be confessed that nearly all of them, with the exception of the Dutch Fokker airplanes, are copied more or less from old military airplanes and fail to meet the requirements of modern commercial airplanes. The principal advantage of commercial airplanes, in comparison with other means of transportation, must consist in the quick and comfortable overcoming of long distances. The necessary conditions, on the one hand, are great reliability of functioning, good flight characteristics, and good navigating instruments which will enable the pilot, without great exertion, to follow his course uninterruptedly by day and by night and in all kinds of weather. On the other hand, comfortable accommodations must be provided for the passengers, so they can travel long distances, in both day and night flight, without long interruptions. Hence, in the newest types, much attention has been given to the comfort of the seats and of the sleeping accommodations and to the size and

* "Die kommende Entwicklung des Riesenflugzeuges für den Weltverkehr" in "Luftfahrt," October 23, 1927, pp. 307-311.

ventilation of the rooms.

The maximum economy is attained by using high-powered engines which do not need to be forced during ordinary flight. We already have a series of large commercial airplanes with two, three and four engines. An endeavor is being made to eliminate all dangerous flight stresses through the division of the power plant. In the event of the stopping of one of the engines, such an airplane is still able to continue its flight, at least to the next airport. In the present types, we readily recognize the tendency toward their further development into giant airplanes.

The Junkers "G 31," Rohrbach "Rocco" and Dornier "Super-Wal" may be regarded as the initial types in this development. The Junkers "G 31" has three Jupiter engines with a total of 1350 HP. and can carry 25 persons. It is designed for long cross-country flights. The Rohrbach "Rocco" and Dornier "Super-Wal" are equipped with two Rolls Royce engines of 650 HP. each and are the largest and most powerful commercial seaplanes in use. The "Do R-Jas," which resembles the "Super-Wal," will, however, be equipped with four Jupiter engines, with a total of 1800 HP., and will therefore be more powerful than any of its predecessors.

In these engines, the wings are not yet large enough to provide sufficient utilizable space inside of them. The necessary rooms must therefore be located in the fuselage. In the

coming giant airplanes, however, the wings will be thick enough to contain accommodations for passengers.

The project "J-1000" of Professor Junkers (Fig. 1) is the most interesting one, because it embodies the Junkers "Nurflügel" (all wing) patent idea. The endeavor is to construct an ideal airplane which will consist entirely of lift-producing parts (wings). This monoplane, built of duralumin and steel, is of the so-called "Ente" (duck) type. In this type, the elevator is located in front of the wing (Fig. 1). The four 3000 HP. engines, as likewise the accommodations for 100 passengers, are inside the wing. Due to the large wing span of 70 m (230 ft.) and the thickness of the wing, there is enough room for everything, notwithstanding all the girders and braces. The observation rooms in the leading edge of the wing adjoin the living rooms, which are comfortably furnished for both day and night flying. There is a central corridor running the whole length of the wing. The wing is entirely cantilever and carries a rudder near each tip. Two short fuselages, also serving as passage ways, support the continuous elevator on their front ends and carry, at their rear ends, two rudders with vertical stabilizing surfaces. These four rudders afford excellent lateral steering control. The control cabin is situated over the center of the leading edge of the wing.

The well-known aircraft constructor, Dr. E. Rumpler, has likewise designed a gigantic seaplane, the data for the calcula-

tion of which he has been collecting for years. Dr. Rumpler has given much attention to the distribution of the load (Figs. 2, 3 and 4). The weights of the engines, floats, fuel, passengers, etc. are distributed along two-thirds of the span, each portion of the load being thus supported by the corresponding section of the wing. This method of distribution enables a far greater increase in the dimensions of the seaplane than would otherwise be possible. The Rumpler transocean seaplane is likewise an all-metal monoplane of 94 m (308 ft.) span and 39.3 m (129 ft.) length. The whole central portion of the wing has a uniform cross section or profile with no sweep back, but the two free ends have both sweep back and dihedral. There are six floats in all, the four main ones being extended backward, so as to form supports for the tail planes. Dr. Rumpler hopes thus to obtain sufficient seaworthiness for very rough seas. Since the base, resting on the water, is very broad, the lateral tilting moment in the oblique position can be more readily absorbed. The power plant consists of ten engines uniformly distributed throughout the central portion of the wing, with pusher propellers behind its trailing edge. The living rooms are in the front part of the wing. Some of them are larger and luxuriously fitted up. Each ordinary room has six seats and is provided with front windows and skylights. Each room is completely separated from the other rooms. In order to deaden the noise of the engines, there is a broad corridor between the passenger rooms and the

engine rooms. The control cabin is above the middle of the wing. The fuel tanks are all in the floats. The seaplane can carry fuel for 16 hours of flight. With no head wind, it would be possible to fly 4400 km (2735 miles) at full engine power. For economical reasons, however, this distance would never be flown without interruption, since the carrying of so much fuel would produce excessive stresses. Dr. Rumpler therefore suggests the Azores and Bermudas as intermediate stations.

Another especially noteworthy project was worked out by Dr. Grulich, the technical manager of the German "Luft-Hansa" (Air Union), who likewise adopted the principle of the greatest possible decentralization of the load. His seaplane is a twin-hull high-wing monoplane (Fig. 5). In contrast with the Rumpler, the Grulich has ten 1000 HP. engines in the leading edge of the wing. For greater safety, the propellers are staggered, so that the bursting of a propeller would not be so liable to damage an adjacent propeller. The Grulich has a span of 115 m (377 ft.) and a length of 60 m (197 ft.). The passengers are likewise accommodated in spacious comfortably furnished cabins located in the wing. The supports for the two large hulls inclose the control cabin and navigation room, as also the dining and smoking rooms for the passengers. For the sake of increasing the safety, the engines are intended to be throttled to correspond to the lightening of the load through fuel consumption, so that the R.P.M. will remain nearly constant.

A fourth project, which should not be overlooked, was designed by Klamt of Breslau. This seaplane, an all-metal cantilever monoplane, differs somewhat from the other projects in its external form (Fig. 6). It has a span of 140 m (459 ft.) with a relatively short length of 60 m (197 ft.). The wing rests on three towers which, in turn, are supported by three large hulls. The stern of the central hull is raised and, with the aid of two slender auxiliary fuselages, supports the tail planes. The power plant consists of five 3000 HP. engines. Two of these engines lie in the leading edge of the wing and drive tractor propellers, while the three other engines are installed in the trailing edge and drive pusher propellers. The passengers are accommodated in the front and middle thirds of the wing along the larger portion of its span. A passage way connects the cabin groups. In the central section of the wing there is a special control cabin with windows on all sides. Klamt estimates the cost of such^a seaplane at about 7,500,000 marks (nearly \$1,800,000) and the shortest time to build it at two years.

This survey of the latest German airplane projects shows how perseveringly the realization of the giant airplane is being sought. Ocean traffic is now carried on by ships alone, but it will not be long before it will be carried on both by ships and by aircraft, cooperating with and supplementing one

another. The present plans and attempts are but the harbingers of a new epoch in world air traffic.

Translation by Dwight M. Miner,
National Advisory Committee
for Aeronautics.

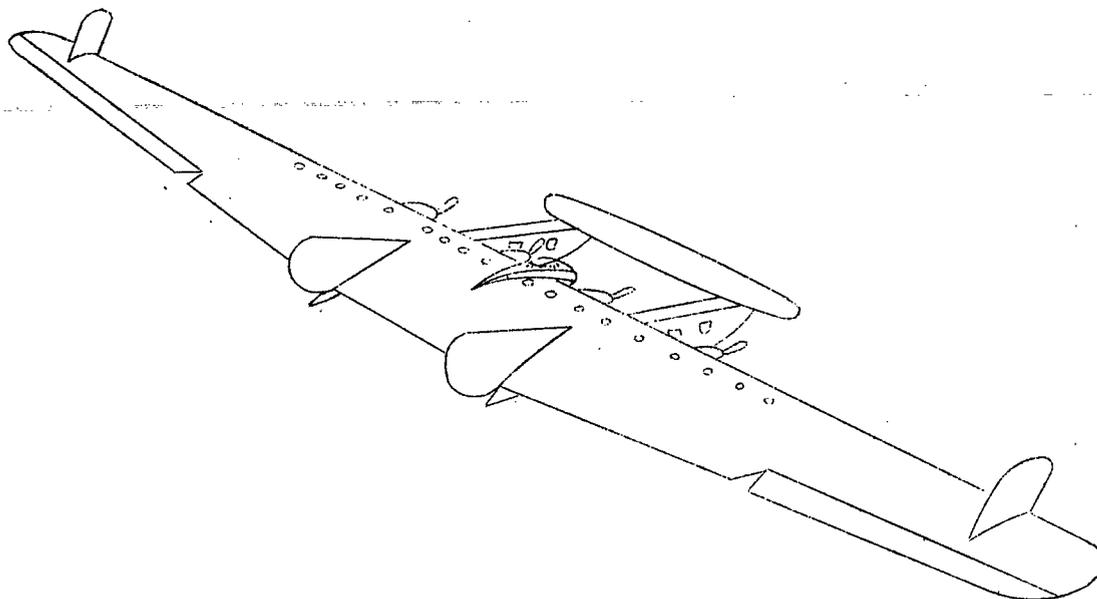


Fig.1 Junkers giant airplane project "J-1000" the "Flying Wing".

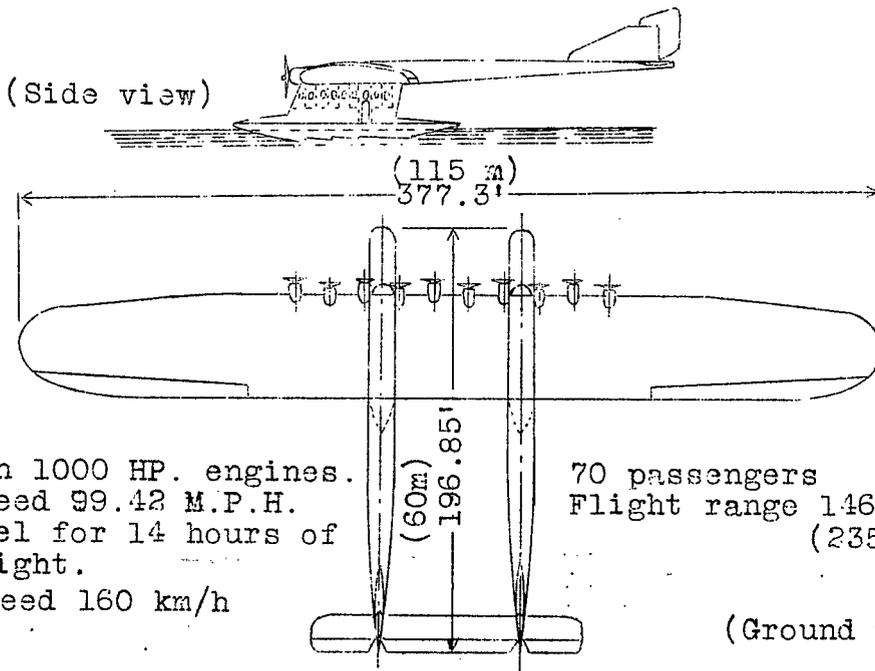


Fig.5 Karl Grulich's 10000HP. giant seaplane project.

Fig.2

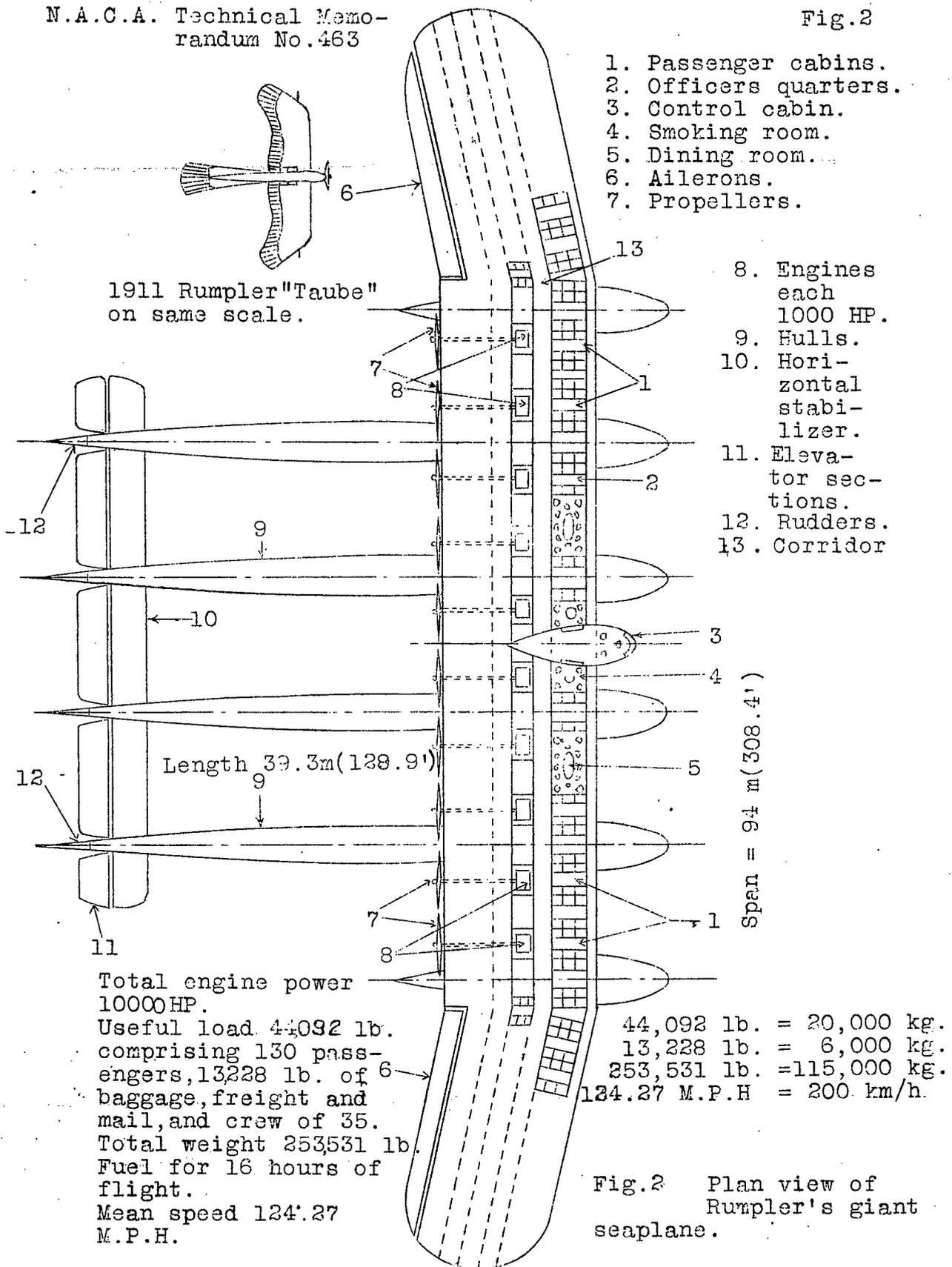
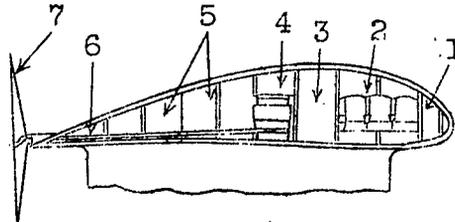


Fig.2 Plan view of Rumpler's giant seaplane.



1. Lookout room.
2. Living room.
3. Corridor.
4. Engine room.
5. Mail room.
6. Propeller shaft.
7. Four-bladed propeller.

Fig.4 Section of wing of Dr. Rumpler's giant seaplane project.

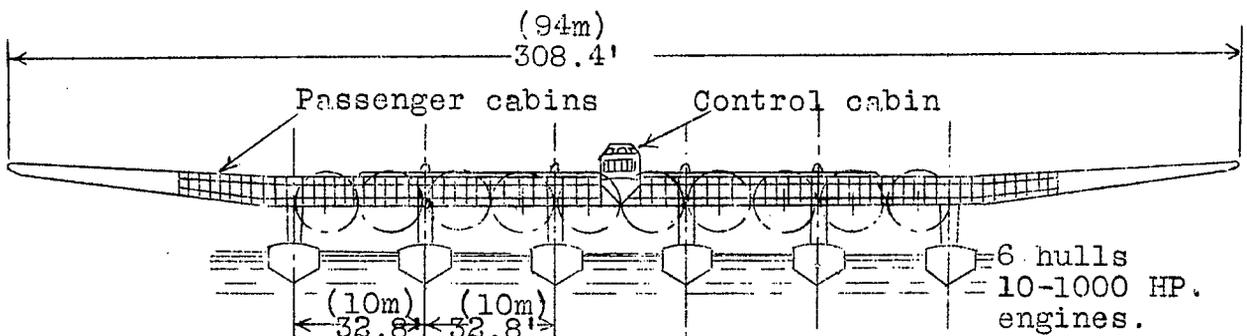


Fig.3 Front elevation of Rumpler's giant seaplane.

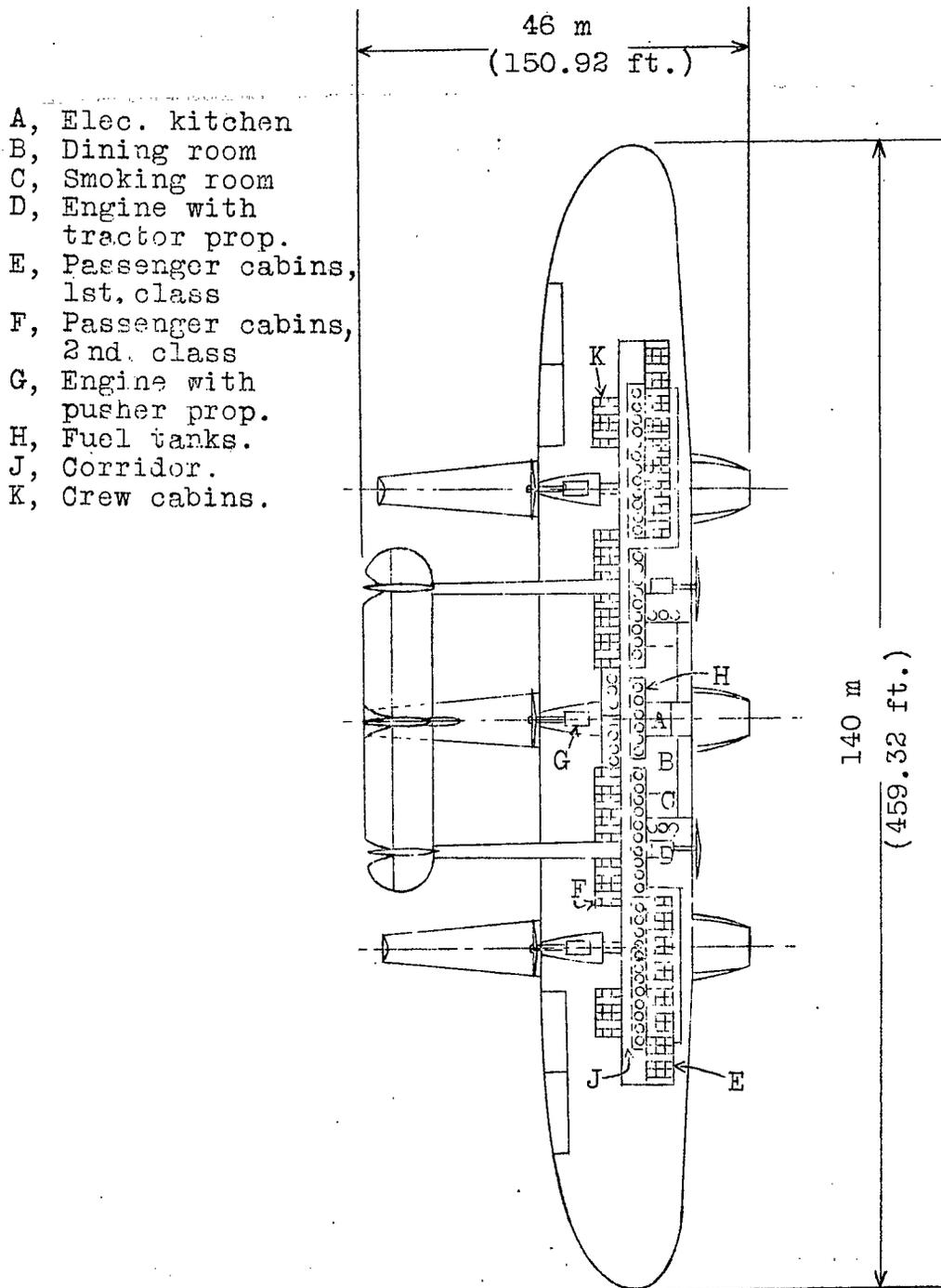


Fig.6 R. Klamt's 15000 HP giant-seaplane project. (Ground plan.) Five 3000 HP engines. Speed 265 km/hr. (165 mi./hr.) 150 passengers. Crew of 35. Fuel 72000 kg (158733 lb.)

